

Page W. Inspection of Whey Collection and Processing. (Form DA - 151 - 12)

Use this page if the plant requests status for any whey products, including whey cream. All equipment used in collecting, storing, and separating the whey, starting at the cheese vats, should be included in the survey. If the whey is to be membrane processed, use this Page for the whey collection and storage, then use Page M to cover the subsequent processing. If only the salty whey is membrane processed, then added to the sweet whey, use the appropriate items on this Page (no Page M is required).

If the whey is condensed and dried at the same plant using an evaporator, inspect whey collection and handling using this page, then use Page D to inspect the subsequent processing operations. The code for "Whey" is optional but Pages W and D are required to assign the code for "Concentrated Whey" or "Dry Whey" (Page M is required also if the whey is preconcentrated using a RO system).

Collection of Whey

Pay particular attention to the collection of whey from the various steps in the cheese making procedure. Whey drippings from nonproduct contact surfaces shall not be collected for further processing as human food.

Item W1—Room Construction (58.126).

See the guidelines for Item A1—Room Construction.

Use this item to recommend correction of any deficiencies regarding construction, maintenance, etc., in the room where whey intended for human food is collected or stored. The unseparated whey tanks and salty whey tanks shall be in an area constructed, lighted, and maintained at a level consistent with production of human food as required for other dairy products.

Pay particular attention to condition and cleanliness of the floors.

Item W2—Lighting & Ventilation (58.126d, e, 58.443).

See the guidelines for Item A2—Lighting & Ventilation.

Item W3—Pumps, Pipelines, & Valves (58.128, 58.146a, 58.443).

See the guidelines for Item A3—Pumps, Pipelines, & Valves. The same requirements apply as for pumps, pipelines, and valves used for milk handling.

Also, if probes are used, inspect the vacuum-whey pipelines.

Item W4—Fines Saver(s) (58.428).

See the guidelines for Item C30—Fines Return & Fines Saver.

Use Item C30 to report deficiencies in the fines collection and return and this item for deficiencies in whey collection.

Item W5—Collection of Sweet Whey (58.128, 58.443).

The whey must emanate from cheese handled in equipment designed to be sanitary not only for the cheese contact surfaces, but also for the whey contact surfaces. All equipment shall meet 3-A Sanitary Standards criteria. Equipment for which there are no 3-A Sanitary Standards will be inspected according to requirements outlined in the *USDA Equipment Guidelines*.

Some of the sweet whey is pumped from the cheese vats or tables directly to the unseparated whey tank or fines saver. Therefore, some deficiencies in the vats may affect the whey (cracked or unclean drain grates, etc.) and should be referenced here also.

If the whey from any area is not intended for human food, it is recommended that the whey drain directly to the floor. However, if collection pans, troughs, or piping are employed, there shall be no cross connections with the whey collected for human food. Completely segregated systems shall be provided. If there is any potential for cross connection between the two systems recommend the INELIGIBLE status (category A deficiency).

Item W6—Collection of Salty Whey (58.128, 58.443).

Since salty whey is quite corrosive, it is cautioned that type 316 stainless steel would be more suitable for constructing tanks and equipment instead of the more commonly employed type 304. Equipment that is pitted is unsatisfactory, recommend polishing the rough surfaces. When definite or pronounced pitted conditions are observed recommend that the equipment be repaired or replaced. Continued use of definite or pronounced pitted equipment will result in a reduction or loss of approved plant status.

Equipment operated on a batch or vat basis shall be cleaned or thoroughly rinsed between vats. Make recommendations as appropriate. For equipment operated on a continuous basis, inspect the salty whey collection pans and pipes for accumulations of a product residue. Pay particular attention to the wet/dry interface areas where residues may not be removed by the normal flushing action of the extruded whey. When accumulations are noted recommend that the areas be rinsed periodically (at least once every two hours of operation) with potable water or approved process water. Recirculated whey, permeate, and cow water are not acceptable rinsing media.

Salty Whey Collected During the First Application of Salt.

The following equipment commonly used at this stage of cheese making is satisfactory provided it is clean, in good condition and has received USDA acceptance of design and construction.

1. Enclosed mellowing conveyors.
2. Cheesemaker III
3. Open or closed drain tables
4. Open cheese vats

Salty whey collected at a hooping station.

Manual Filling of Hoops With Curd Pails or Shovels is now used only at small factories. Nevertheless, the manual system of curd hooping is considered satisfactory if the whey collection procedures are conducted in a sanitary manner. These hooping operations are usually conducted with the hoops located on the bottom of the make vat or drain table. The salty whey runs across the bottom of the vat or drain table to a collection container at the vat outlet. The collection method must be sanitary and assure no intermingling with the sweet whey.

Hooping of larger styles, such as barrels and 640's, usually incorporates a pneumatic conveying system. Guidelines for inspecting the lines, filters, cyclone, barrel extensions, etc. are on Page C. Deficiencies in these areas should not be repeated here.

Use the following guidelines when inspecting the various types of hoops, moulds, etc.

A. Stainless Steel 40 lb. Block Hoops.

Satisfactory if:

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The hoop construction (both interior and exterior) is satisfactory for product contact. Check for cracks, crevices, bolted area, etc. which do not meet product contact surface criteria. Make recommendations as appropriate.

B. Perforated Hard Plastic 40 lb. Block Hoops or Moulds.

Satisfactory if:

1. made of approved FDA and "3-A" plastic material,
2. accepted for sanitary design by USDA-Dairy Grading Branch,
3. effective hoop washing equipment is provided.
4. If the plastic mould has a supportive stainless steel frame, the frame must have sanitary construction as it is considered as a salty whey contact surface.

Check the Accepted Equipment list. If the hoops are not listed, follow the guidelines for Item A3—Pumps, pipelines, & Valves.

C. Miscellaneous Hoops (daisies, longhorns, etc.).

Stainless steel construction is recommended. However, well-tinned iron hoops utilizing proper fabrication (no spot welds, rough welds, cracks, crevices, etc.) are acceptable. Plastic construction is also satisfactory if the material complies with FDA criteria and the *3-A Sanitary Standards for Multipule-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment (as amended), Number 20-*. If plastic hoops are used, effective washing equipment shall be provided, and the design shall be reviewed and accepted by the Dairy Grading Branch. Pay additional attention to the exterior surfaces that come into contact with the salty whey (see the guidelines for Item C46—Hoops, Forms, & Press Cloths).

D. Barrels.

The following construction is satisfactory provided the salty whey is protected from contamination from the exterior of the barrel, supports, monorail system, etc.

1. stainless steel
2. painted iron that is paraffin coated and lined with a single service polyethylene liner
3. solid or corrugated fiberboard, lined with a single service polyethylene liner.

Note:

The perforated draining cover must also be of sanitary construction. Threads are allowed on the draining cover clamps provided they are taken apart and cleaned effectively after each days use.

The greatest quantity of salty whey is withdrawn shortly after filling (hooping) operations using perforated probes and a vacuum whey handling system, which is similar to a milking machine. Such systems will be acceptable provided inspection reveals sanitary construction and good sanitation. Disassemble and inspect the interior construction of the probe system. Pay special attention to attachment of flexible hoses to stainless steel stub ends. All stubs are to be removed for cleaning. Vacuum systems generally are not designed for mechanical cleaning yet are frequently circulated with cleaning solutions. When vacuum probe systems are not clean make appropriate recommendations. Deficiencies in sanitation or fabrication of the exterior of the probes should be listed under Item C48—Probes and should not be repeated here.

Subsequently, the barrels are pressed or tipped slightly downward and more salty whey drains out into open catch trays or into individual containers. Generally, protecting the salty whey collected from these containers is very difficult. When this salty whey is to be used for human food, the collection equipment must be of sanitary stainless steel or other approved construction. It must also be well sloped for drainage, protected against contamination from the environment, air cylinders, exterior of the barrels, monorail system, etc. This may require special shields or methods of attachment of the polyethylene liner to the collection system. These areas will be assessed at the time of the initial inspection. Tinned metal or plastic construction is not acceptable.

E. 640 Containers.

The vacuum probing and draining methods are approximately the same as for cheese in barrels, and the same inspection criteria will apply, in addition to the following guidelines.

1. Stainless steel construction.

Welded construction is satisfactory if the welds are continuous and polished to a number 4 finish.

Knockdown type construction is satisfactory if inspected and accepted by USDA Dairy Grading Branch. Check the *Accepted Equipment List*. If the hoops are not listed, follow the guidelines for Item A3—Pumps, Pipelines, & Valves.

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2. Hard plastic construction.

See the guidelines for "B. Perforated Hard Plastic 40lb. Block Hoops or Moulds." above.

Note:

There are at least two Arena designs. The moulds date stamped after 2/92 are designed and accepted for the collection of salty whey. Boxes prior to that date are acceptable, provided the salty whey is not collected and utilized for human food.

3. Solid or corrugated fiberboard, lined with single service polyethylene liner.

Satisfactory provided the salty whey is protected from contamination from the exterior of the 640 forms or box, supports, carts, monorail system, etc. This may require special shields or methods of attachment of the polyethylene liner to the collection system.

4. Wooden construction.

These containers are usually knockdown type made of paraffined plywood panels and using painted iron angle-shaped frame and corners, held together with tensioned and clamped steel bands.

Salty whey withdrawn by vacuum probing may be separated or desalted for human food use. All salty whey recovered through subsequent pressing or draining operations shall be diverted to the floor or for uses other than human food.

Salty whey collected during cheese pressing.

The most commonly used pressing systems for American type cheeses are:

A. 40 lb. Blockforming Towers (Wincanton etc.).

The salty whey is extracted through a combination of a vacuum and the pressure from the cheese mass in the tower. It passes through perforated drain plates and collects in a balance tank fitted with two level probes to control a pump at the tank outlet. It is then pumped to a plant supplied salty whey storage tank.

When the blocks of cheese emerge from the blockformer, they are immediately bagged and sealed. There is no further collection of salty whey.

Note:

Wincanton blockformers installed by Stoelting Inc. after July 1988 have pump control probes installed only 2 inches apart so that the whey is pumped out frequently. On earlier installations, the probes are about 12 inches apart. In such

cases, mark the report as unsatisfactory and recommend the upper level probe (which starts the pump) be retrofitted with the newer length probe.

B. Conventional Open Horizontal or Vertical Cheese Presses.

1. The press collection pan, rails, and press head must be of sanitary stainless steel construction.
2. The press environment and overhead areas shall be satisfactory, so that nearby operations or overhead conditions do not allow contamination of the salty whey.

The salty whey recovered for human food shall require that the presses are individually inspected for sanitary design and construction, protection against contaminants, and sanitary collection of the salty whey.

Collection containers for salty whey from open presses (both vertical and horizontal) shall be of sanitary design with stainless steel or other approved construction materials. Tinned metal or plastic containers are not acceptable.

Collection containers shall be stored on sanitary racks when not in use or following cleaning. The containers shall be emptied frequently, at least hourly. When this is not possible, as with overnight cheese pressing at small factories. If the plant is collecting such salty whey recommend the INELIGIBLE plant status (category A deficiency). When troughs are used rather than pans, they shall be rinsed at least every 2 hours.

Whey draining operations should be placed so that employees do not have to step over open pans or troughs. If this is noted, recommend relocation or provision of covers.

Large drain pans, as often used with monorail draining systems, should be pitched slightly for self-drainage to the pump.

C. Enclosed Tunnel Presses and Vacuum Chambers.

With some of these systems, special moulds are used to press the cheese inside an enclosed tunnel using pressure from air cylinders or from air filled rubber bladders. The salty whey runs to one end of the press for direct piping to a plant storage tank.

The filled moulds are mechanically conveyed to the pressing tunnels and some salty whey drips from the moulds. When this whey is to be recovered for human food use, the moulds, conveyors, catch pans, and piping system must be of USDA accepted sanitary design and construction and maintained in a sanitary condition. Thoroughly inspect all surfaces of the pressing tunnel.

When inspecting a conventional vacuum chamber follow the guidelines for cheese presses above.

D. Miscellaneous Draining and Pressing Systems.

These will be individually inspected and evaluated. Follow appropriate inspection guidance for product contact surfaces and for the protection of the collected salty whey from contamination by the environment. All components are to be maintained in a sanitary condition. If questions arise concerning the inspection criteria, contact the National Field Office for guidance.

Item W7—Miscellaneous Equipment.

In some cases, deficiencies in the cheese making equipment will also affect the whey codes. If this occurs, use this item to identify the equipment, the deficiency, and the category classification that need to be added to the whey code totals.

Item W8—Unseparated Whey Tank(s) (58.128d).

See the guidelines for Items A28—Storage Tanks - Silo & A29—Storage Tanks - Horizontal.

The holding tank for unseparated whey shall be made of stainless steel or other equally corrosion-resistant metal and constructed for easy cleaning. Inspect the tank for condition and cleanliness. Half-moon-type tanks used at some small factories are satisfactory. However, enclosed type conventional tanks should be encouraged whenever plant layout or expansion is planned.

Item W9—Whey Heating or Cooling (58.810).

If the whey is to be separated, this should be done as soon as practical after drawing to minimize the storage time at critical temperatures in the unseparated whey tank. When processing or separating cannot be carried out promptly, the whey must be either heated or cooled until processing commences. The General Specifications require that “Unless processed within 2 hours, all whey or condensed whey, except acid type whey with a titratable acidity of .40% or above, or a pH of 4.6 or below, shall be cooled to 45°F or less, or heated to 145°F or higher.” (§58.810a).

Questions have arisen about the “within 2 hours” requirement as it applies to plant survey work. This wording was not intended to preclude the common industry practice of continuous in-out processing from a single unseparated whey storage tank. A surge or supply tank is often used ahead of the whey separator to compensate between the rapid drawing of whey when the desired acidity is reached and the comparatively slower fixed rate of the separator.

In other words, if the plant survey reveals in-out sweet whey storage that is kept at minimum levels so as to promote processing as rapidly as practical, the practice is satisfactory. It is impossible to present guidelines regarding the amount of whey to be considered satisfactory for in-out storage; it would depend on equipment processing rates and individual plant circumstances. Whey retention time in such tanks can also be minimized by the manner of setting up the inlet and outlet piping. With a long horizontal tank, for instance, it would be best

to pipe the whey in at one end and to remove it from the other end (in-out piping at the same end would tend to cause relatively static fluid flow conditions in the other end).

Use of two tanks alternately should be considered for whey handling operations that extend over long periods of time and might otherwise result in significant bacterial increases in the unseparated whey. If the plant survey reveals poor whey handling practices, recommend correction under this item number.

The last sentence of §58.810a permits other whey temperatures for essential technological reasons, such as lactose crystallization and membrane processes, provided that the quality and wholesomeness of the product is not impaired. Accordingly, do not criticize temperature variations employed to induce lactose crystallization in condensed whey for either drying or lactose production. Similarly, different temperatures may be utilized for membrane processing (ultrafiltration, reverse osmosis, electrodialysis, gel fractionation, ion exchange, etc.), provided that the combination of temperature and processing residence time do not impair product quality or wholesomeness. Consult with the National Field Director about questionable whey handling practices with respect to temperature.

§58.810b also requires that "Recording thermometers shall be required and so located to assure that cooling or heating requirements in §58.810a are met."

First of all, temperature recorders will not normally be required for those special technological processes that are exempted from 145°F heating or 45°F cooling requirements. Second, they are not required for the whey that is promptly processed within two hours (including in-out tanks) and is therefore also exempt from the 145°F heating or 45°F cooling requirements.

For the whey that is subject to the heating or cooling requirement, check that a recording thermometer is provided, and properly located, to monitor that the requirements are met.

When the whey is held at 145°F or higher, location of the recorder sensor may vary depending on the particular processing setup. They might be located in the storage tank, in the pipeline to the storage tank, after the heater, etc. Use your judgment in determining satisfactory placement of the sensors. Temperature recorders are also needed when the plant cools and stores the whey at 45°F or below prior to processing. As with hot whey, the sensor locations shall assure that the cooling requirement is met. When recorders are absent or not properly located, make a recommendation for providing them.

So-called "acid whey" from cottage cheese, cream cheese, etc., which has pH of 4.6 or below or titratable acidity of .40% or above will exhibit a natural inhibitory effect toward bacterial propagation. It is not necessary that acid whey be cooled to 45°F or heated to 145°F if there is delay before processing into human food. Such whey may be handled at drawing temperature, approximately 110—120°F without criticism.

For manufacture of modified whey products, artificial souring of sweet type whey to approximately pH 4.6 by the addition of a suitable food grade acid, when used together with a suitable heat treatment of the whey to destroy lactic and staph bacteria, is a satisfactory

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practice to approximate acid whey conditions and thus avoid the need for cooling to 45°F or heating to 145°F. Storage and shipment of such artificially acidified sweet whey at 135°F is satisfactory. The acidification should be performed as soon as practical after separation of the milkfat from the whey. This method of handling sweet whey may be useful where denaturation of whey proteins caused by excessive heating might be deleterious to the product or to subsequent processing operations, such as reverse osmosis or ultra-filtration.

Item W10—Salty Whey Tank(s) (58.128d).

See the guidelines for Item A29—Storage Tanks - Horizontal.

The use of farm bulk tanks is an acceptable alternative, provided the tank meets the *3-A Sanitary Standards for Farm Milk Cooling and Holding Tanks, Number 13-* or the *3-A Sanitary Standards for Farm Milk Storage Tanks, Number 30-*.

Item W11—Salty Whey Heating or Cooling (58.443).

Promptly after collection, the salty whey shall be heated to a minimum of 125°F or cooled to 45°F or lower and be stored at that temperature until it is separated, and subsequently held until membrane processing is started.

The maximum age of salty whey before membrane processing shall be 60 hours, calculated from the time the first salty whey in the batch is produced until start-up of membrane processing of the batch. Check plant production records of collection and storage. Make recommendations as appropriate.

The heating may be accomplished by an in-line heater or by mixing with hot salty whey maintained at 125°F minimum in the storage tank(s). If direct steam injection heating is used, check that the steam is produced according to *3-A Accepted Practices for a Method of Producing Steam of Culinary Quality, Number 609-*. Also, check the steam injectors for sanitation and compliance with *3-A Sanitary Standards for Steam Injection Heaters for Milk and Milk Products, Number 61-*.

If there is heat loss during pumping, fines removal and centrifugal separation, the salty whey shall be immediately reheated so the contents of the batch tank and balance tank (if provided) of the membrane processing system is maintained at 125°F or higher.

Check for provision of automatic means of temperature control and recording thermometers on:

1. tanks for storage of salty whey prior to separation, and
2. the batch tank of the membrane processing system.

Accurate indicating thermometers shall be provided to allow correct adjustment of the recording thermometers. Sensors of the indicating and recording thermometers shall be located close to each other. If the controls and thermometers are not present, functioning, or properly located mark the report "unsatisfactory" and recommend the INELIGIBLE status.

Item W12—Housekeeping (58.126e, 58.127f, 58.146d).

See the guidelines for Item A7—Housekeeping.

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Processing of Salty Whey

Item W14—Room Construction (58.126).

See the guidelines for Item A1—Room Construction.

Preferably whey processing operations should be in a separate room or building from the cheese making operation, but this is not mandatory.

Item W15—Lighting & Ventilation (58.126d, e, 58.443).

See the guidelines for Item A2—Lighting & Ventilation.

Item W16—Pumps, Pipelines, & Valves (58.126, 58.146a, 58.443).

See the guidelines for Item A3—Pumps, Pipelines, & Valves.

Item W17—Clarifier or Separator (58.128e).

See guidelines for item B4—Separator.

With the advent of whey fines savers and self-cleaning separators, there is less need for the centrifugal clarifiers. When present, inspect them in the same manner as outlined for separators. Also check that bowl sludge is disposed of in a way that does not create a nuisance.

Item W18—High Pressure Pump (58.128).

Show NA for Items W18 through W20 if the salty whey is not desalted using membranes.

The high pressure pump is usually a piston pump (homogenizer) or a multiple stage centrifugal pump.

See the guidelines for Item D19—High Pressure Pump if a piston-type pump is used.

See the guidelines for Item A3—Pumps, Pipelines, & Valves if a multiple stage centrifugal pump is used.

Item W19—Membrane Processing (58.128, 58.809).

The quarterly USDA approved plant publication will not include a new product code to identify “desalted salty whey” since it will be mixed into another whey product and will not exist as a separate item of commerce. It is management prerogative which operations or products are to be subjected to USDA-Dairy inspection. However, if product codes are desired for any whey

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products, inspection and approval is also required for any membrane processing operation for salty whey that is located at the same plant.

A. Time and Temperature Requirements.

The processing time in the membrane equipment shall not exceed 18 hours.

The 18-hour maximum processing time shall be controlled by adjusting the batch size to be commensurate with the membrane system capacity and the degree of desalination required. Processing runs in excess of 18 hours are unsatisfactory. Mark the report and make an appropriate recommendation.

The salty whey shall be processed at a minimum temperature of 125°F. The 125°F storage and processing temperature has been researched by Dr. S. R. Tatini of the University of Minnesota as suitable from a bacteriological control standpoint. This recommendation is satisfactory to USDA.

If the retentate is not pasteurized immediately upon completion of membrane processing, it shall be cooled to 45°F or below. If the holding period before further processing is less than 20 hours, the retentate may be heated and held at 145°F or higher instead of cooling. If the subsequent processing operations involve continuous in-out handling through a balance tank at a temperature range above 45°F or below 145°F, two balance tanks shall be supplied and their use shall be alternated at least every 4 hours with thorough cleaning of the tanks after each use.

B. Diafiltration Operations.

See the guidelines for Item M19—Diafiltration Water.

Evaporator cow water or reverse osmosis (RO) permeate shall not be used for diafiltering unless the responsible state regulatory water control agency has established a satisfactory monitoring system and provides written approval for this reuse as process water (see the guidelines for Item A38—Water Supplies & Handling).

C. Pasteurization.

The retentate (desalted whey) shall be pasteurized at some suitable stage of processing at the plant. The desalted whey can be added to the sweet whey and pasteurized prior to the evaporator, membrane processing (see the guidelines for Item D5—HTST Sealed _____ at _____ sec. _____ °F), or shipment from the plant. The pasteurization temperature and holding time shall be appropriate for the total solids content of the product or product mixture. If the whey is not pasteurized at the plant where it is desalted assign the INELIGIBLE status (category A deficiency). If pasteurization is not accomplished in “3-A” equipment recommend the INELIGIBLE status (category A deficiency).

D Membrane Modules.

See the guidelines for Item M18—Membrane Modules.

E Records.

See the guidelines for Item M25—Recording Charts, Item M26—Processing Log, Item M27—Flux Test Reports, and Item M29—Membrane Module Log.

F Source Ingredients.

If salty whey is received from outside sources, whether USDA approved or not assign the INELIGIBLE status (category A deficiency).

Item W20—Permeate Storage & Utilization (58.128d, 58.810).

See the guidelines for Items M35—Permeate Storage and M36—Permeate Use.

Item W21—Housekeeping (58.126e, 58.127f, 58.146d).

See the guidelines for Item A7—Housekeeping.

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Processing of Whey

Item W23—Room Construction (58.126).

See the guidelines for Item A1—Room Construction.

Preferably whey processing operations should be in a separate room or building from the cheese making operation, but this is not mandatory.

Item W24—Lighting & Ventilation (58.126d, e, 58.443).

See the guidelines for Item A2—Lighting & Ventilation.

Item W25—Pumps, Pipelines, & Valves (58.128, 58.126a, 58.443).

See the guidelines for Item A3—Pumps, Pipelines, & Valves.

Item W26—Separator (58.128e).

See guidelines for item B4—Separator.

If the same separator is used for both sweet whey and salty whey, show “Same as W17” next to this item and list the category of the deficiency in the unsatisfactory column, it is not necessary to repeat the recommendations.

Item W27—HTST Sealed _____ at _____ sec. _____ °F (58.128, 58.809).

See the guidelines for Item B5—HTST Sealed _____ at _____ sec. _____ °F.

Show NA for this item if the whey is shipped raw or heat-treated, or if the pasteurization step is at the evaporator or a membrane system.

If the salty whey has been desalted by membrane processing and added to the whey, see the guidelines for Item W19—Membrane Processing for further pasteurization requirements.

If whey is received from other plants it shall be pasteurized unless the solids content is 40% or greater.

Item W28—Heat-Treating or HTST Equipment (58.128, 58.809).

See the guidelines for Item C6—Heat-Treating or HTST Equipment.

Item W29—Heat-Treating at _____ sec. _____ °F (58.128, 58.809).

See the guidelines for Item C7—Heat-Treating at _____ sec. _____ °F.

Item W30—Storage Tank(s) (58.128d).

See the guidelines for Items A28—Storage Tanks - Silo & A29—Storage Tanks - Horizontal.

When tanks are used for storage of “sweet” whey for more than two hours prior to processing, product shall be either: a) 45°F or lower or 145°F or above; or b) alternate tanks can be used as outlined in Item W9—Whey Heating or Cooling (in-out storage is not acceptable).

Check that a recording thermometer is provided to verify proper storage of the whey if either the heating or cooling option is practiced.

This storage temperature requirement does not apply to “acid whey” from cottage or similar type cheeses. The low pH of such whey, approximately 4.6, effectively restricts bacterial growth.

Item W31—Utilization of Whey (58.808).

Show the human food utilization of the whey on the report (dry whey, lactose, dry whey-NDM blends, etc.). If shipped from the plant, show the name and address of the plant that receives the whey.

Whey for processing must be fresh and originate from milk meeting §58.132 through §58.138 of the General Specifications. This requirement is satisfied if the whey originates from a cheese plant that is USDA approved for cheese and whey (approval of these operations involves review of plant milk quality and USDA analysis of milk samples for DMCC). The requirement is also satisfied if the whey originates from a Grade A cheese plant in which the entire milk supply is Grade A. In this case the manifest or bill of lading must state that the product is Grade A, the plant must be on the IMS list with the product code(s) for whey, and the whey handling after removal from the vat must be inspected and approved by the applicable Grade A authority. In such instances, determination of satisfactory Grade A inspection coverage on the whey will be made by the National Field Director through contact with the Grade A authority having jurisdiction over the cheese operation. If satisfactory arrangements cannot be made for Grade A inspection of the whey handling operations, USDA survey and approval is required.

The General Specifications §58.808 wording allows ingredients approved by the FDA to be added to whey during processing. Some ingredients the plant may be using include: neutralizers, phosphate compounds (such as Quadrafos or Metafos), peroxides for bleaching purposes (see paragraph B below), and defoamers (see paragraph C below). It is not our intent here to list all the FDA permitted additives. It is the plant management's responsibility to ascertain the legal status about any intended additives, to use required food grades of such

materials, to use them in accordance with any applicable FDA limitations or guidance, and to ensure the labeling of the final product meets applicable FDA requirements.

Notwithstanding this responsibility on the part of plant management, if you should observe additive uses that appear to conflict with these guidelines, discuss the matter with the plant manager and then bring the details to the attention of the National Field Director for guidance.

A. Neutralizing of whey.

The acidity of whey may be adjusted by the addition of safe and suitable pH adjusting ingredients. When sodium hexametaphosphate (Quadrofos) is encountered during a plant survey it should not be marked as unsatisfactory or influence the plant status assignment provided its use is within the following parameters.

1. It is used at a level of less than 1.0%.
2. Its use level is at the absolute minimum level necessary to accomplish the purpose for which it is intended.
3. If there is any functional or technological reason for the sodium hexametaphosphate in the food (i.e., bakery goods, ice cream) in which the whey is used it must be declared on the label as an ingredient.

It will be necessary for the survey inspector to ask sufficient questions to determine that the above parameters are being followed.

B. Bleaching of whey.

Although hydrogen peroxide and benzoyl peroxide may be used to bleach whey, the FDA does not permit the use of these chemicals as preservatives. The intended purpose can usually be distinguished by the manner of use. Whey bleaching for the production of white color, dry whey is commonly carried out by adding the peroxide to preheated whey in a storage tank (where the plant alternates between 2 tanks) or to the hot well prior to condensing. Its bleaching effect is greatly reduced at lower temperatures, therefore, improper use as a preservative should be suspected if the peroxide is added under any of the following circumstances:

1. Prior to the separator or at any point upstream of the preheating stage to the evaporator.
2. Prior to holding the whey for extended periods (more than 2 hours) at temperatures between 45 and 145°F.

Examples:

Whey is processed in an RO system then stored in a silo overnight prior to condensing in an evaporator. Peroxide is added just prior to the silo and the

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temperature of the whey in the silo is 125°F. In this example the peroxide is being used as a preservative.

If, in the above example, the peroxide was added prior to the silo but the temperature in the silo was lower than 45°F or higher than 145°F, the use of peroxide is acceptable. In this example the temperature in the silo is the means of quality control.

Call the National Field Director if you need guidance regarding proper bleaching practices. Collect relevant details first, such as the name of the chemical, the amount added, where it is added in the process, product temperature, and method of peroxide dissipation (whether by addition of a catalase enzyme, release during subsequent drying process, etc.). Since hydrogen peroxide and benzoyl peroxide shall not be used for preservative purposes, the details of their use are important to determine proper use for bleaching purposes only.

C. Defoamers.

The use of defoamers is allowed in whey. The defoamer should be added to the whey after the separator. For more information on defoamers see the guidelines for Item C33.

Item W32—Animal Feed Handling (58.443a).

See the guidelines for Item D43—Waste Products Handling.

Show NA when the whey is intended for human food.

Item W33—Load-out Facilities (58.131).

See the guidelines for Item B31—Load-out Facilities.

Item W34—Housekeeping (58.126e, 58.127f, 58.146d).

See the guidelines for Item A7—Housekeeping.

Processing of Whey Cream

Item W37—Room Construction (58.126).

See the guidelines for Item A1—Room Construction.

Item W38—Lighting & Ventilation (58.126d, e, 58.443).

See the guidelines for Item A2—Lighting & Ventilation.

Item W39—Pumps, Pipelines, & Valves (58.128, 58.146a, 58.443).

See the guidelines for Item A3—Pumps, Pipelines, & Valves.

Item W40—Separator (58.128e).

See guidelines for item B4—Separator.

Show “Same as W17 (or W26)” next to this item and list the category of the deficiency in the unsatisfactory column. It is not necessary to repeat the recommendations.

Item W41—HTST Sealed _____ at _____ sec. _____ °F (58.128, 58.809).

See the guidelines for Item B5—HTST Sealed _____ at _____ sec. _____ °F.

Show NA for this item if the whey cream is shipped raw or heat-treated.

Item W42—Heat-Treating or HTST Equipment (58.128, 58.809).

See the guidelines for Item C6—Heat-Treating or HTST Equipment.

Item W43—Heat-Treating at _____ sec. _____ °F (58.128, 58.809).

See the guidelines for Item C7—Heat-Treating at _____ sec. _____ °F.

Item W44—Whey Cream Tank(s) (58.128d, 58.443c).

See the guidelines for Item A29—Storage Tanks - Horizontal.

The use of farm bulk tanks is an acceptable alternative, provided the tank meets the 3-A *Sanitary Standards for Farm Milk Cooling and Holding Tanks, Number 13-* or the 3-A *Sanitary Standards for Farm Milk Storage Tanks, Number 30-* .

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Whey cream is a human food product and shall be handled accordingly, employing clean, properly constructed and maintained equipment. If shipped from the plant it may or may not be pasteurized or heat treated. If used in the manufacture of butter it shall be pasteurized at the plant where churned.

The handling, cooling, and storage of whey cream in stainless steel or well tinned clean milk cans is a satisfactory practice. Check all the empty whey cream cans available using the inspection guidelines for Item A5—Condition of Producer Cans. When more than 10 percent are in an unsatisfactory condition, show a recommendation for correction and a summary of the inspection results.

Example:

W44. — Reduce off-condition whey cream cans below 10 percent (5 of 15 examined were rusty/dirty - 33 percent) (B).

Check that the whey cream in cans is cooled immediately after separation. Placing filled cans of whey cream in the cheese cooler without prior cooling is an unsatisfactory practice because of the very slow cooling that takes place. If such conditions are encountered, recommend that the plant cool the cream prior to filling the cans or cool the cans with a recirculating type spray cooler (this would only be practical at small cheese plants, with limited amounts of whey cream).

When separating directly into a cooler or pasteurizing vat, check that the cooling is continuous and the temperature maintained at 45°F or below. Also check the cooler for sanitation, and for proper construction, covers, flush type valves, proper agitator seals, etc.

If the whey cream is shipped to another plant for butter making it shall be picked up frequently. Make applicable recommendation if cream is not shipped at least every four days.

If the cream is shipped from the plant and the plant mixes or blends whey cream with other cream in any proportions, the USDA status assigned shall be for "whey cream" (this would not be necessary if the cream is churned at the same plant and a separate status is assigned for butter).

If a plant that ships both sweet cream and whey cream desires to be approved for both products, check carefully to see that the plant keeps both products completely segregated. If a single processing system such as separator/clarifier, heat-treating system, HTST system, or vat pasteurizer is to be used for both products during a production run, the whey cream shall be processed last, unless all components in the common system(s) have been subjected to a complete CIP cleaning cycle or have been manually cleaned. Likewise, if common load-out facilities are used for whey cream and cream, the whey cream shall be loaded out last unless all piping, pumps, valves, and associated fittings have been subjected to a full CIP cleaning cycle or manually cleaned. Whey cream and cream shall be stored in separate, clearly identified tanks.

Some plants standardize the milk for cheese making by the addition of whey cream. Do not criticize the practice when the whey cream is properly handled prior to addition, that is, it is added promptly after separation or is cooled and stored satisfactorily until it is used.

Item W45—Load-out Facilities (58.131).

See the guidelines for Item B31—Load-out Facilities.

If the same facilities are used for both the whey and the whey cream, it is not necessary to repeat the recommendation. Write “Same as W34” next to this item and list the category of the deficiency in the unsatisfactory column.

Item W46—Housekeeping (58.126e, 58.127f, 58.146d).

See the guidelines for Item A7—Housekeeping.

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General Items

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